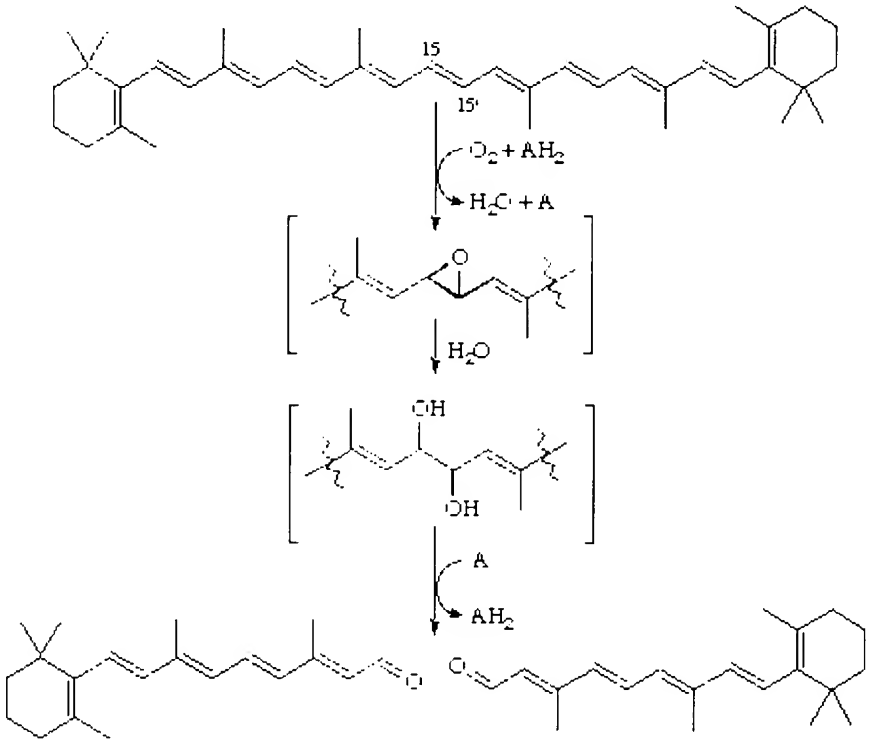
EC 1.14.99.36

β-carotene 15,15'-monooxygenase



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enzymes homepage.
EC 1.14.99.36 β-carotene 15,15'-monooxygenase

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[LinkDB]

ENTRY EC 1.13.11.21 Obsolete
NAME Transferred to 1.14.99.36
CLASS Oxidoreductases
Acting on single donors with incorporation of molecular oxygen (oxygenases)
With incorporation of two atoms of oxygen
COMMENT Transferred entry: now EC 1.14.99.36, beta-carotene 15,15'-monooxygenase (EC 1.13.11.21 created 1972, deleted 2001)
DBLINKS IUBMB Enzyme Nomenclature: 1.13.11.21
ExPASy - ENZYME nomenclature database: 1.13.11.21
WIT (What Is There) Metabolic Reconstruction: 1.13.11.21
BRENDA, the Enzyme Database: 1.13.11.21
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ENTRY	EC 1.14.99.36
NAME	beta-carotene 15,15'-monooxygenase beta-carotene 15,15'-dioxygenase, carotene dioxygenase carotene 15,15'-dioxygenase
CLASS	Oxidoreductases Acting on paired donors with incorporation of molecular oxygen Miscellaneous
SYSNAME	beta-carotene:oxygen 15,15'-oxidoreductase (beta-cleaving)
REACTION	beta-carotene + O2 = 2 retinal
SUBSTRATE	O2 beta-carotene
PRODUCT	retinal
COMMENT	Requires bile salts and Fe(II). The reaction proceeds in three stages, epoxidation of the 15,15'-double bond, hydration of the double bond leading to ring opening, and oxidative cleavage of the diol formed. Cf. EC 1.14.15.6, cholesterol monooxygenase (side-chain-cleaving). Thus only one atom of the dioxygen is incorporated into retinal. Formerly EC 1.13.11.21, as it was considered to be a dioxygenase.
REFERENCE	1 Lindenberger, M.S., Engeloch-Jarret, C. and Woggon, W.D. The reaction mechanism of the enzyme-catalysed central cleavage of beta-carotene to retinal. Angew. Chem. Int. Ed. 40 (2001) 2614-2616. 2 Goodman, D.S., Huang, H.S., Kanai, M. and Shiratori, T. The enzymatic conversion of all-trans beta-carotene into retinal. J. Biol. Chem. 242 (1967) 3543-3554. [PMID:6047013] Goodman, D.S., Huang, H.S. and Shiratori, T. Mechanism of the biosynthesis of vitamin A from beta-carotene. J. Biol. Chem. 241 (1966) 1913-1922.
PATHWAY	PATH: MAP00830 Retinol metabolism
ORTHOLOG	KO: K00516 beta-carotene 15,15'-monooxygenase
GENES	HSA: 8669 (BCO1) MMU: 94857 (Bco1) RNO: 311416 (Bco1) DRE: 541053 (bco1)
DISEASE	MIM: 605748 Beta-carotene 15,15-prime-dioxygenase
DBLINKS	IUBMB Enzyme Nomenclature: 1.14.99.36 ExPASy - ENZYME nomenclature database: 1.14.99.36 WIT (What Is There) Metabolic Reconstruction: 1.14.99.36 BRENDA, the Enzyme Database: 1.14.99.36 CAS: 37256-60-3

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[LinkDB]

ENTRY EC 1.14.99.36
NAME beta-carotene 15,15'-monooxygenase
beta-carotene 15,15'-dioxygenase, carotene dioxygenase
carotene 15',15'-dioxygenase
CLASS Oxidoreductases
Acting on paired donors with incorporation of molecular oxygen
Miscellaneous
SYSNAME beta-carotene:oxygen 15,15'-oxidoreductase (bond-cleaving)
REACTION beta-carotene + O2 = 2 retinal
SUBSTRATE
beta-carotene
PRODUCT retinal
COMMENT Requires bile salts and Fe(II). The reaction proceeds in three stages, epoxidation of the 15,15'-double bond, hydration of the oxirane bond leading to ring opening, and oxidative cleavage of the diol formed (cf. EC 1.14.15.6, cholesterol monooxygenase (side-chain-cleaving)). Thus only one atom of the dioxygen is incorporated into retinal. Formerly EC 1.13.11.-, as it was first considered to be a dioxygenase.
REFERENCE 1
Leuenberger, M.G., Engeloch-Jarret, C. and Woggon, W.D. The reaction mechanism of the enzyme-catalysed central cleavage of beta-carotene to retinal. Angew. Chem. Int. Ed. 40 (2001) 2614-2616.
2
Goodman, D.S., Huang, H.S., Kanai, M. and Shiratori, T. The enzymatic conversion of all-trans beta-carotene into retinal. J. Biol. Chem. 242 (1967) 3543-3554.
3 [PMID:6049513]
Goodman, D.S., Huang, H.S. and Shiratori, T. Mechanism of the biosynthesis of vitamin A from beta-carotene. J. Biol. Chem. 241 (1966) 1491-1492.
PATHWAY PATH: MAP00830 Retinol metabolism
ORTHOLOG KO: K11351 beta-carotene 15,15'-monooxygenase
GENES HSA: 136[illegible] (BCO2)
MMU: 2385[illegible] (Bco2)
RNO: 1141[illegible] (Bco2)
DRE: 5403[illegible] (bcmo)
DISEASE MIM: 605[illegible] beta-carotene 15,15-prime-dioxygenase
DBLINKS IUBMB Enzyme Nomenclature: 1.14.99.36
ExPASy - ENZYME nomenclature database: 1.14.99.36
WIT (What Is There) Metabolic Reconstruction: 1.14.99.36
BRENDA, the Enzyme Database: 1.14.99.36
CAS: 37256-80-3
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